

High Cost Gas – Statewide Rule 101 (Tight Formations)

Stephan Paetzold, Engineering Unit

Overview



- What is High Cost Incentive and Statewide Rule (SWR) 101 Background
- How to Obtain Certification of High Cost Gas Production
 - Part I Area Designation Application
 - Part II Individual Well Certification (Form ST-1)

What is High Cost Gas Incentive?



Texas Tax Code 201.057(C)

Eligible high-cost gas "is entitled to a reduction of the tax imposed by this chapter for the first 120 consecutive calendar months beginning on the first day of production, or until the cumulative value of the tax reduction equals 50 percent of the drilling and completion costs incurred for the well, whichever occurs first. The amount of tax reduction shall be computed by subtracting from the tax rate imposed by section 201.052 the product of that tax rate times the ratio of drilling and completion costs incurred for the well to twice the median drilling and completion costs for high-cost wells as defined in subsection (a)(2)(a) spudded or completed during the previous state fiscal year, except that the effective rate of tax may not be reduced below zero."



16 TAC Part 1, §3.101

Natural Gas Policy Act (NGPA) State Alternate Procedures

Certification for Severance Tax Exemption or Reduction for Gas Produced from High-Cost Gas Wells

Rule 101 specifies the procedure by which an operator can obtain a Railroad Commission of Texas *certification* that natural gas from a particular gas well qualifies as *high-cost* natural gas under the Texas Tax Code... and that such gas is eligible for a reduction of the severance tax.



High Cost Gas is defined in SWR 101 as natural gas which the Commission finds to be:

- produced from any gas well, if production is from a completion which is located at a depth of more than 15,000 feet;
- produced from geopressured brine;



High Cost Gas is defined in SWR 101 as natural gas which the Commission finds to be:

- occluded natural gas produced from coal seams;
- produced from Devonian shale; or
- produced from designated tight formations or produced as a result of production enhancement work.



- 75,748 wells have been certified as producing high cost gas since state administered program started
- 99 percent of high cost gas in Texas is from "tight formations"
- 1 percent from Deep Gas Wells



- A tight gas formation is one that:
 - The in-situ (pre-stimulation) permeability (K) throughout the proposed formation or specific portion thereof is 0.1 millidarcies (md) or less, as determined by geometric mean or median analysis of available data from all wells that have either been tested or completed in the proposed formation within the requested area.
 - The geometric mean or median pre-stimulation stabilized production rate against atmospheric pressure (Q) for all wells does not exceed the rate in listed in the yardstick table within SWR 101.
 - No well drilled into the formation is expected to produce, without stimulation, more than 5 bbls crude oil per day.

Production Rate Yardstick Table



Top of Formation		Maximum Allowable	Top of Formation		Maximum Allowable
Average Depth Range (ft)		Production Rate (MCF/D)	Average Depth Range (ft)		Production Rate (MCF/D)
0	1,000	44	8,000	8,500	388
1,000	1,500	51	8,500	9,000	449
1,500	2,000	59	9,000	9,500	519
2,000	2,500	68	9,500	10,000	600
2,500	3,000	79	10,000	10,500	693
3,000	3,500	91	10,500	11,000	802
3,500	4,000	105	11,000	11,500	927
4,000	4,500	122	11,500	12,000	1,071
4,500	5,000	141	12,000	12,500	1,238
5,000	5,500	163	12,500	13,000	1,432
5,500	6,000	188	13,000	13,500	1,655
6,000	6,500	217	13,500	14,000	1,913
6,500	7,000	251	14,000	14,500	2,212
7,000	7,500	290	14,500	and deeper	2,557
7,500	8,000	336			

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- General Exhibits
 - Area Map, Notice of Application, etc.
- Geologic Exhibits
 - Structure Map, Logs, Description, etc.
- Engineering Exhibits
 - Table of Data, Calculations, etc.



- General Exhibits
 - No application "form," but rather a report
 - Report should include
 - Operator name/number
 - Field name(s)/number(s)
 - Approximate acreage of Designated Area
 - Geologic Discussion
 - Engineering Discussion
 - Copy of Notification
 - Area Map



- General Exhibits
 - Notice of Application
 - Form can be found at

http://www.rrc.state.tx.us/media/2792/tightgasnotice.pdf

- Lists formation, field(s), surveys, and means of protesting the application
- Include a copy of the Area Designation map
- Notify all operators in all fields as listed on the proration schedule no more than a month prior to the application
- Application may not be granted prior to 21 day protest period



General Exhibits

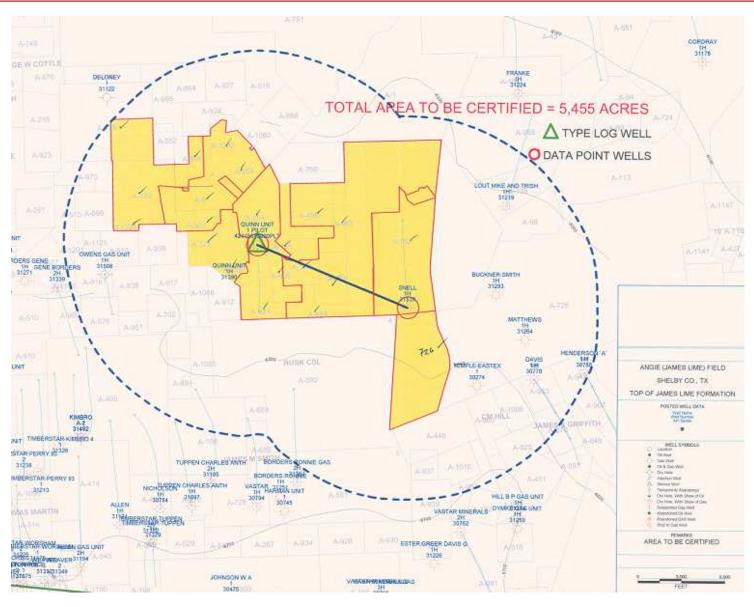
- Area Map
 - clearly outline the proposed area
 - highlight all data point wells and indicate which wells the applicant operates

(a data point well is defined in the rule as a well that has been tested and/or produced in the proposed tight gas formation; and, from the test results or other data, applicant provides a measured or calculated in-situ permeability and/or prestimulation stabilized flow rate against atmospheric pressure)



- General Exhibits
 - Area Map (cont.)
 - include counties, surveys, and abstracts
 - provide gas id or API number for all wells that penetrate the proposed tight interval







SWR 101 does not strictly define the shape or size that an Area must take...there is great flexibility in the outline of the proposed Area.

However....

Please keep in mind that:

- no part of the Area may extend past a 2½ mile radius drawn from a data point well
- all wells with <u>available</u> data that have been tested or completed in the proposed formation must be included in the analysis



December 2011 Notice to Oil and Gas Well Operators:

http://www.rrc.state.tx.us/oil-gas/publications-and-notices/notices-to-industry/notices-to-industry-2008-2013/

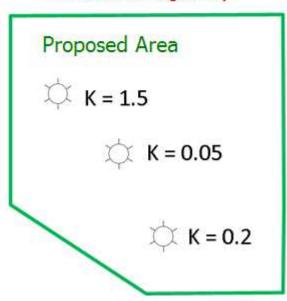
- Any sections of non-contiguous acreage must qualify on their own with respect to the permeability and flow rate requirements of SWR (101)
- Any non-contiguous acreage cannot be more than 2½ miles apart
- All data points must be located within the proposed area
- Potential data point wells cannot be excluded from the application by a "window"



$$K_G = 0.25$$

$$K_{\text{median}} = 0.2$$

Does Not Qualify

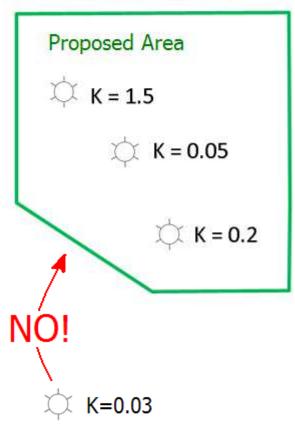




$$K_G = 0.25$$

 $K_{\text{median}} = 0.2$

Does Not Qualify



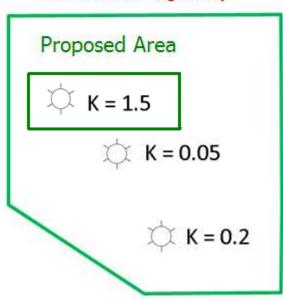
Data Point must be within Area



$$K_G = 0.25$$

$$K_{\text{median}} = 0.2$$

Does Not Qualify

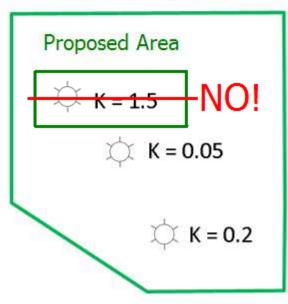




$$K_G = 0.25$$

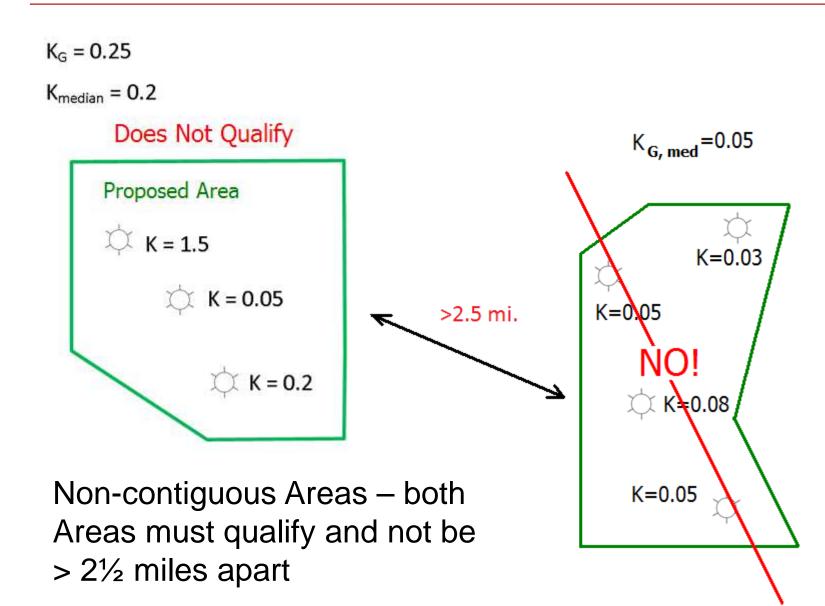
 $K_{\text{median}} = 0.2$

Does Not Qualify



"Window" acreage – cannot exclude data







- General Exhibits
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 - Table of Data, Calculations, etc.



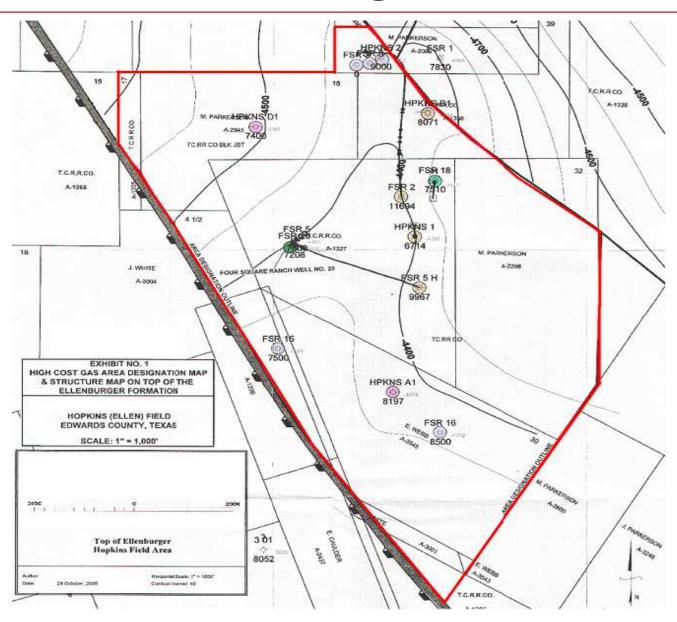
Geologic Exhibits

- Geologic Description
 - Provide a brief geologic description of the proposed formation area, in geological terms appropriate to the region, formation and field.

Structure Map

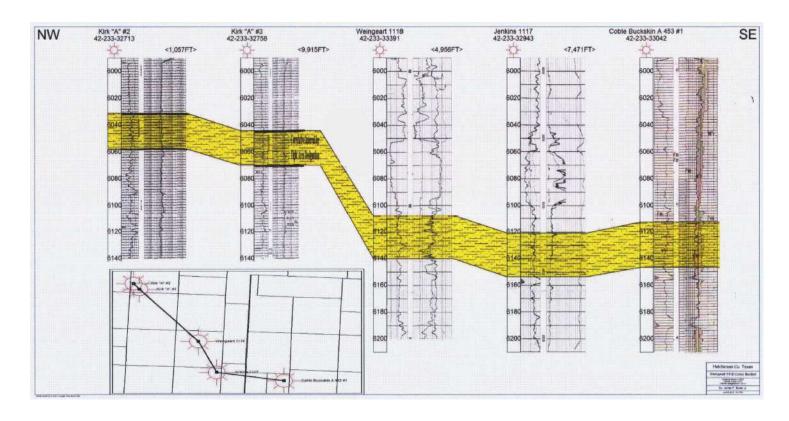
- Contoured on the top of the proposed tight formation
- Include elements helpful to understanding the geology of the tight formation area, e.g. faults, etc.





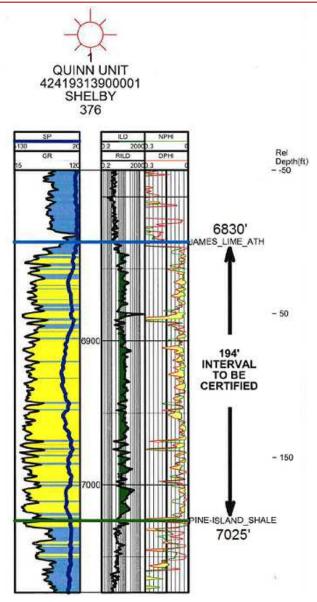


- Geologic Exhibits
 - Cross-section

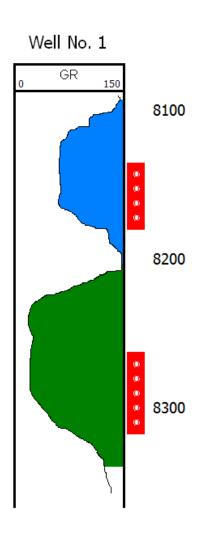




- Geologic Exhibits
 - Type Log
 - Identify well
 - Show top and bottom of proposed tight interval
 - Include large enough portion of log to show important markers





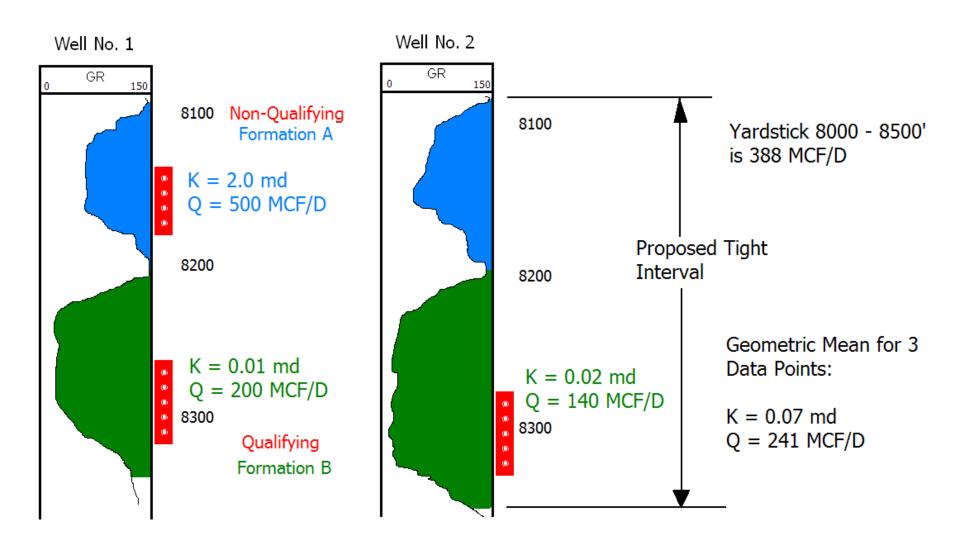


Multiple Horizons

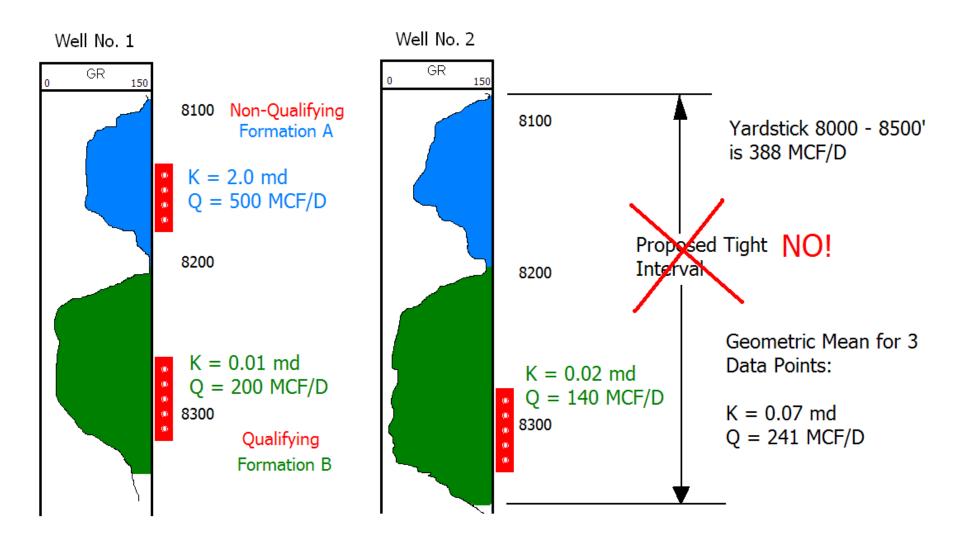
- Each horizon must be represented by at least one data point
- Each horizon must qualify as tight
- Any point within the proposed Area must be 2½ miles of a data point for all horizons

(if the proposed Area is an expansion of a immediately adjacent previously approved Docket, the Area will be reviewed consistent with the approved Docket)

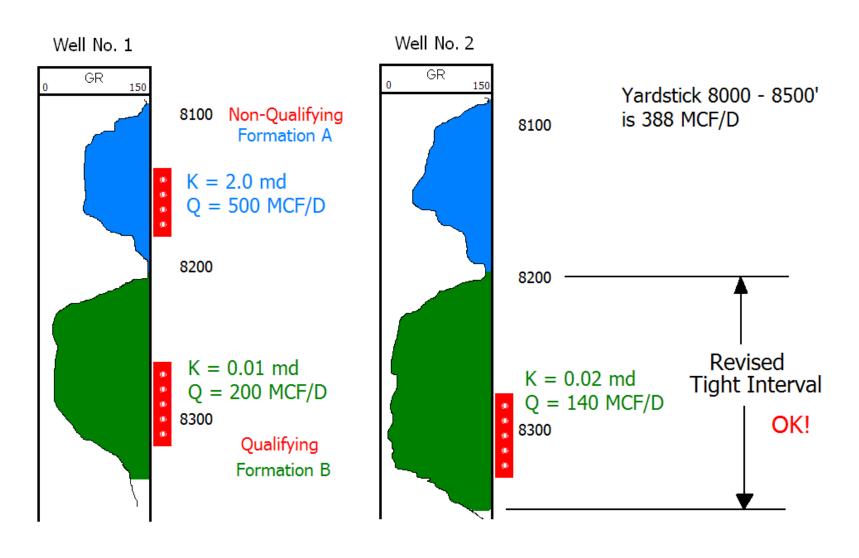




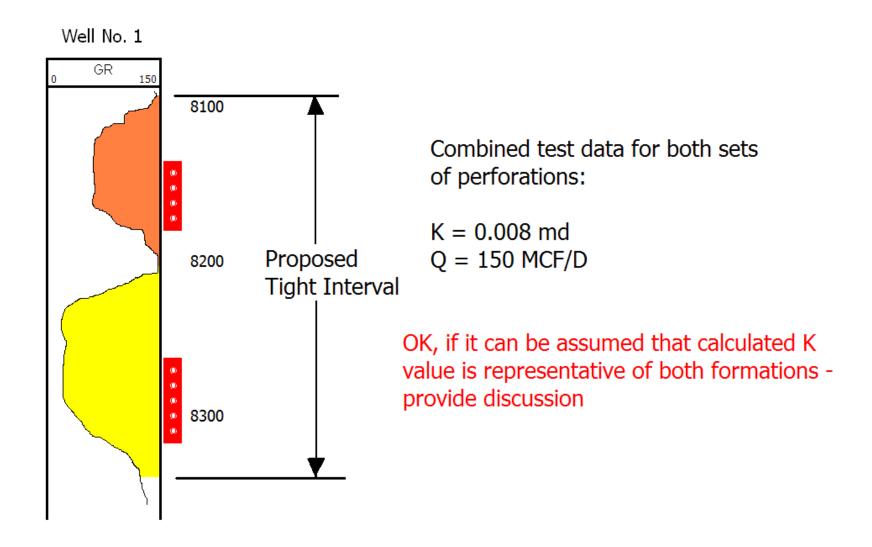














- General Exhibits
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- Geologic Exhibits
 - Structure Map, Logs, Description, etc.
- Engineering Exhibits
 - Table of Data, Calculations, etc.



Engineering Data:

The rule recognizes that there may be some variability in the data available to make a determination.

- Geometric Mean Analysis
 Central Tendency
- Median Analysis
 Eliminates Outliers



Geometric Mean

$$k_G = \sqrt[n]{k_1 \cdot k_2 \cdot \dots \cdot k_n}$$

for example:

samples: 2,4,6

geometric mean = $(2*4*6)^{1/3} = 3.6$



Median: the middle value of a onedimensional sample set

- For an EVEN number of samples
 - If a < b < c < d
 - Then the Median = $(b+c) \div 2$
- For an ODD number of samples
 - If *a* < *b* < *c* < *d* < *e*
 - Then the Median = c



Table of Data

				Pre-stimulation
				Flow Rate Against
Well Name/No.	Gas id/API No.	Completion Interval (ft.)	in-situ K (md)	Atmospheric Pressure (MCF/D)
Sample Unit A No. 1	100000	8010 - 8030	0.020	256
Sample Unit A No. 2	200000	8000 - 8025	0.070	314
Sample Unit A No. 3	300000	8080 - 8120	0.360	560
Sample Unit B No. 4	400000	8040 - 8070	0.100	300
Sample Unit B No. 5	500000	8030 - 8065	0.090	275
Sample Unit B No. 6	600000	8010 - 8050	0.080	106
Sample Unit B No. 7	700000	8060 - 8080	0.075	102
Sample Unit B No. 8	800000	8090 - 8110	0.230	412
		geometric mean =	0.094	253
	(or)	median =	0.085	288



Engineering Calculations:

- If any wells that penetrate the proposed tight interval are not included in the analysis, please provide an explanation
- All data points must be completed within the proposed tight interval
- Demonstrate that no well drilled into the formation is expected to produce, without stimulation, more than 5 bbls crude oil per day



Engineering Calculations:

- Provide the method used to determine permeability and production rate for each data point well, e.g. ONEPT,
 PROMAT, core data, pressure buildup analysis, etc.
 - Is the data pre-fracture stimulation or post?
 - Explain how the assumptions/variables used in the calculations were obtained, e.g. skin, thickness, etc.
 - Provide a copy of the calculations for permeability and flow rate for each data point well.

End of Part I – Area Designations



- If application is complete:
 - The docket will be scheduled for next available
 Railroad Commissioners' Conference
 - Staff's deadline for posting items to the Agenda is generally 1½ to 2 weeks prior to the conference.
 - If the Commissioners sign the Master Order, the drafted Area Designation Final Order will be mailed to the applicant

End of Part I – Area Designations



If application is incomplete:

- Deficiencies will be described in a letter, and potential remedies might be offered.
- Applicant will have the opportunity to
 - Revise the application
 - Withdraw the application
 - Request a hearing on the application
- Texas Administrative Code allows an applicant to make only two supplemental filings to complete an application.

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 - Part II Individual Well Certification (Form ST-1)



- Tight Gas
 - Section I
 - Section II
 - Docket No.!
 - Section IV
 - Certification

rection IV. MARKET PREV 16. Identify the twelve consecution manualyzer volume 1. 2. 3. 17. Name of gas gatherer filed on CERTIFICATION: I declare TNRC §91.143 that I am	ve months in which the month/year 4. 5. 5. 5. Form P-4 to gather the months of the parties of th	saring or venting took place and 1 rotume month. 7. 8. 9.	VCF volume Sare verment exch	nscenii
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Check NGPA high-cost categor 107 Tight Sands Area Designation Docket No.	ry for which incentive			
ection II. HIGH-COST GA	S Incentive Re		Use Form H-12 for EO	tion area R incentive applications
8. Lease Name		9 Lease/ID No	Complete the Indica	Marketing - Sec I,IV red sections and the
6. Field Name		7. Field No,	High-cost Gas – S	ec I,II
Operator address, including city, state, and zip code		Incentive being filed for: (select one)		
4. Operator address including oil	by state, and ain se	HAC		
Section I 1. Operator name, exactly as sho		READ INSTRUCTIONS OF Eation Report	2. Operator P-5 No.	3. RRC Dist. No.
			V DEL JEDOE OIDE	
	-		ATION	
O Box 12967 ustin, Texas 78711-2967	,	SEVERANCE TA CERTIFICA		REV. 11



SWR 101 (e)(5)(B):

 Copies of all G-1 Forms (Gas Well Back Pressure Tests, Completion or Recompletion Reports and Logs) ever filed on the subject well

-If the well was ever in its history an oil well, then all W-2s, also.



SWR 101 (e)(5)(C):

 Specific reference to the commission docket number assigned to the applicable designated tight formation area certification along with a copy of the map with the subject well location shown, which outlines the designated tight formation area approved by the commission.



'Tight' Gas Well Application Procedure SWR 101 (d):

• "... and any additional information deemed necessary by the Commission to clarify, explain and support the required attachments..."



- Is the well within the *Designated Area*?
 - provide the Area map from the Area Designation application
 - location plat for the well may be helpful
 - not necessary for County-wide Area Designations



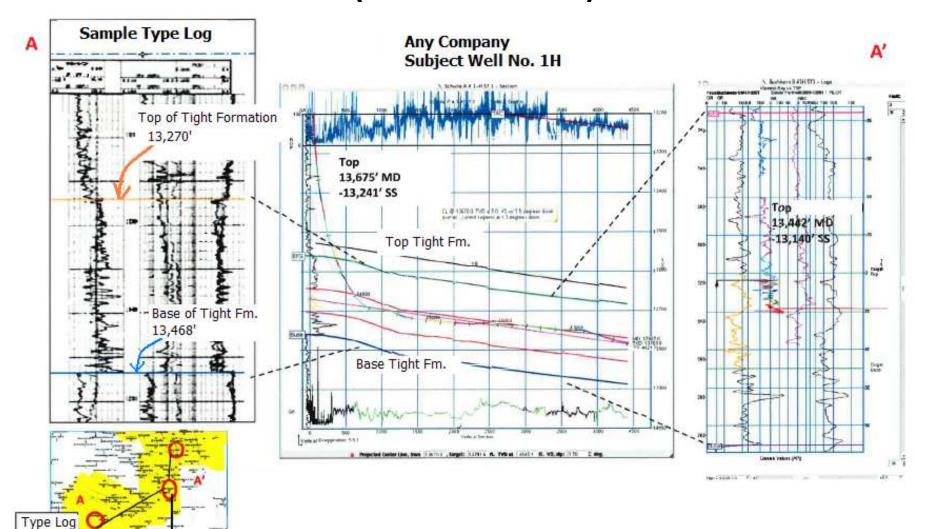
- Is the well completed within the *correlative tight interval*?
 - Final Order will list a correlative True Vertical Depth (TVD) interval referenced to the Area Designation Type Log (G-1 should list Measured Depth (MD) and TVD of completion interval)
 - If perforations are within the numerical TVD depth interval of the Final Order, the Form ST-1 may be approved administratively



- Is the well completed within the correlative tight interval?
 - If perforations are outside the numerical TVD depth interval of the Final Order, the Form ST-1 will be reviewed by Technical Staff:
 - Provide complete electrical log or sufficient portion to identify formations/markers above and/or below tight interval
 - Log not required for Barnett Shale
 - For less common or geologically complex Areas/Formations, a cross-section correlated to the designated tight interval on type log may be helpful...

Subject Well







If a log of the subject well is not available, we can also consider...

- Measured While Drilling (MWD) log that includes the gamma ray curve (should always be available for horizontal/directional wells)
- Log of nearest offsetting vertical well (generally within same survey section)
 - Label the log location on the Area Map



If a log of the subject well is not available, we can also consider (cont.)...

- Structure map
- Mud log
- Any combination of above



An incomplete ST-1 received with minor errors

- Operator notified
- Required or additional information is requested (such as type logs, cross sections, new expanded area designation being approved, etc.)
- Application held until complete
- Application retains original receipt date



An incomplete ST-1 received with numerous and repetitive errors

- Application is returned to the Operator with a notation as to why it was not accepted
- Missing Docket No. (Area not yet approved) is most common error of this type.
- Returned application does not retain the original receipt date if it is later resubmitted



Items to Note:

- Hearing may be requested if denied or partial credit...
- In some cases where a partial tax credit is determined, the amount of the allowable tax credit will be given in terms of a percentage.

For example:

"58 percent has been determined eligible by the Railroad Commission for the above referenced well."

(Tight Gas Producing Interval / Total Producing Interval) × 100%



Items to Note (cont.):

 File Form ST-1 after Area Designation is obtained (we can hold an ST-1 if the Area Designation is filed without major deficiencies and approval is expected to be imminent – ST-1 will be rejected if the Area Designation is denied, withdrawn, or dismissed)



Items to Note (cont.):

— If you would like the approval letter to be emailed, clearly indicate your preference and provide all email addresses at the bottom of the Form ST-1. If you do not want the letters emailed, we will send the letters to the address on the form.



Items to Note (cont.):

- The RRC will date-stamp the ST-1 and assign a docket number to each ST-1.
- Operator can only claim a credit for gas produced during the 24 consecutive calendar months preceding the month the application for certification was filed.



Items to Note (cont.):

 The filing is "locked" into our data base by the date stamp and remains an active file until the application is approved (you won't lose any production credit after the ST-1 has been filed)



FINALLY!

You have a certification from the RRC that your well is producing high cost gas....now what?

answer:

File form AP-180 with the State Comptroller within 45 days including a copy of our letter and ST-1.

(to obtain the maximum tax exemption or tax reduction, the application shall not be filed with the Comptroller after the later of the 180th day after the first day of production or the 45th day after certification by the Commission, otherwise, a 10% penalty will be imposed for the period beginning on the 180th day after first day of production and ending on the date on which the application is filed with the Comptroller)

Contacts



Technical Permitting – Engineering Unit

Rick Behal— Team Leader (512)463-6473 richard.behal@rrc.texas.gov

Stephan Paetzold, P.G. – Technical Reviews (512)463-3163 stephan.paetzold@rrc.texas.gov

Terry Edwards – Administrative Staff (Form ST-1) (512)463-6785 terry.edwards@rrc.texas.gov



The End...Questions?



Does an appropriate area already exist?

• Index Listing of Approved Tight Formations

http://www.rrc.state.tx.us/oil-gas/publications-and-notices/publications/ogtightgas/hgindex/

Oil & Gas Statewide Rule 101 Approved Tight Gas Formation Index Listing

Formation	Docket No.	Date	Page
Frio Formation (Sarita, East(Frio) Field	04-0238912	6/8/2004	381
"14400 Sand Formation (Fifteen Mile Creek (Wilcox) Field	02-0253972	11/6/2007	477
"14900" Sand Series Formation (Fifteen Mile Creek (Wilcox) Field	02-0253971	11/6/2007	476
(SEE FINAL ORDER)Delaware Shale Formation(Toyah, NW(Shale	08-0255806	3/11/2008	428
(SEE FINAL ORDER)Delaware Shale Formation(Toyah, NW(Shale)Balmorhea(Woodford)Fields	08-0255805	3/11/2008	322
10,400,10,800,11,500 Sands (Mission West (Vicksburg 10400) Field	04-0261441	4/28/2009	554
10,600,10,750,11,400,11,800 Sands (Javelina (Vicksburg Cons) Field	04-060915	2/26/2009	548
10200 Formation (Ann Mag (10200) Field	04-0247625	6/6/2006	383
11,300',11,600',12,600 Sands (Emma Haynes (11,400 Wilcox) Field	02-0264560	3/9/2010	609
11300 Sand (Mission, West (Vicksburg 10400) Field	04-0252252	7/21/2009	575



Does an appropriate area already exist?

Approved Tight Formation Listing

http://www.rrc.state.tx.us/media/19422/tightgasapproved.pdf

MARBLE FALLS FORMATION

Docket No 7B-0239579 Burns-Dalton (Marble Falls) Field Order date: 08/10/2004

RRC

Pages: 4 County

Palo Pinto

Cholla Petroleum Inc SEVERANCE TAX ONLY

Depth: Therefore, it is ordered by the Railroad Commission of Texas that effective August 10, 2004, the application of Cholla Petroleum Inc for Commission certification that the portions of the Burns-Dalton (Marble Falls) field within the correlative geologic interval of 3,840 feet to 4,150 feet in the Conglomerate formation and the Marble Falls formation is from 4,150 feet to the base of the Marble Falls as shown on the type log of Snoddy-Stuart No 1 (API No. 42-363-35170) within the requested area of all or a portion of the R.R. Williams A-896, S. C. Neill A-355, P. Lout A-291, J. Lazar A-283 in Palo Pinto County, Texas, identified by plat submitted, is a tight gas formation.



RRC Online (Neubus) Search

RRC home page http://www.rrc.state.tx.us...

Quick Links Box: Data - Online Research Queries...

Oil & Gas Imaged Records Menu...

Oil & Gas Hearing Files...

https://rrcsearch3.neubus.com/esd3-rrc/index.php

Docket Type: NGP



RRC Public GIS Map Viewer

http://wwwgisp.rrc.state.tx.us/GISViewer2/

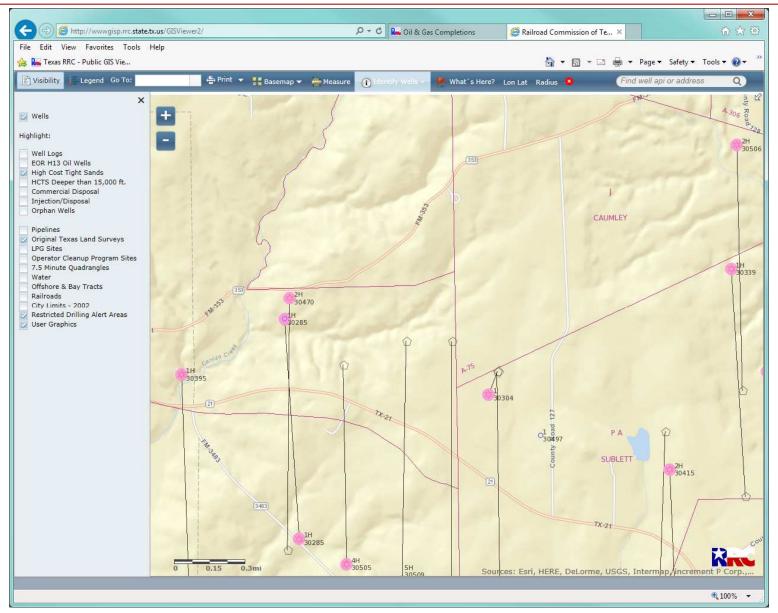
Search by Well API...

Visibility:

- ✓ Wells
- ✓ High Cost Tight Sands

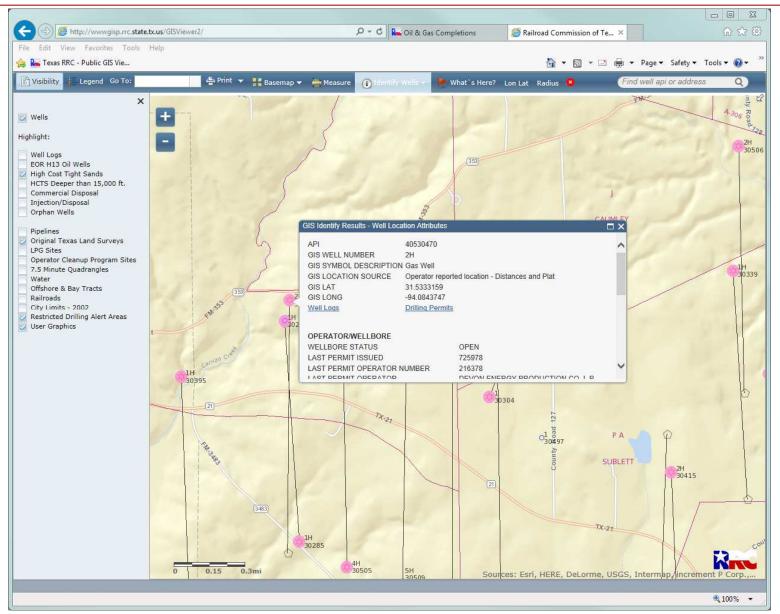
Public GIS Server – Identifying High Cost Gas Wells





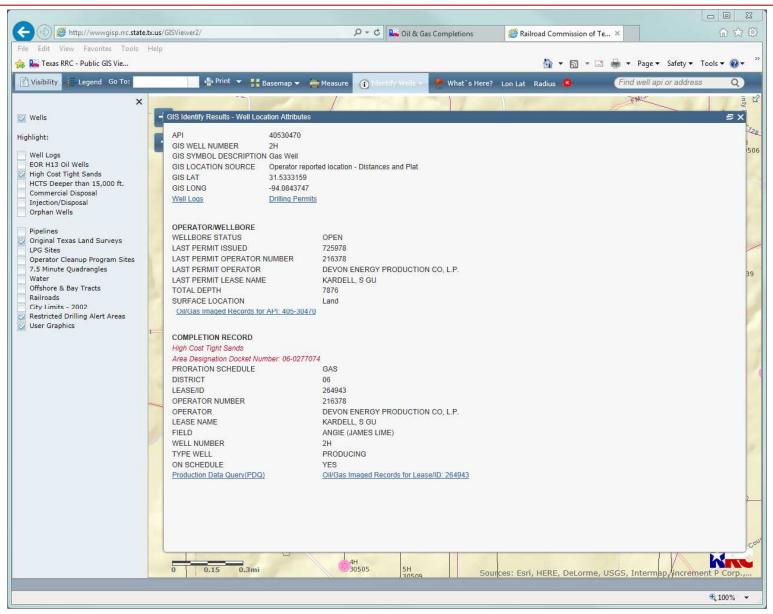
Public GIS Server – Identifying High Cost Gas Wells





Public GIS Server – Identifying High Cost Gas Wells





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